

develop correctly, were present in both nests (fig. 1, C). No phthiisogynes, or similarly affected female pupae, were observed, but several parasitized female larvae were found. According to Wheeler (1910: 418) the ant larvae parasitized by *Orasema* are in many cases able to pupate, but the affected pupae are unable to emerge.

The writer wishes to express his appreciation to Mr. A. B. Gahan for his determinations of *Orasema* and to Miss Esther Coogle for the drawings which appear in this paper.

LITERATURE CITED

- WHEELER, W. M. 1910. Ants, their structure, development, and behavior. Columbia University Press, New York.

Undescribed Species of Crane-Flies from the Eastern United States and Canada (Dipt.: Tipulidae). Part XI

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The preceding part under this title was published in ENTOMOLOGICAL NEWS, 57: 245-252, 1946. The species discussed herewith are chiefly from materials in the Zoological Museum of the University of Michigan, having been sent to me for examination by the Director, Dr. James Speed Rogers. Additional species from other sources are acknowledged in the text.

Tipula (*Lunatipula*) *polingi* n. sp.

♂. Length about 15 mm.; wing 16 mm.; antenna about 5 mm. Closely allied and generally similar to *Tipula* (*Lunatipula*) *flavocauda* Doane, differing in details of coloration of the wings and structure of the male hypopygium.

Wings with a faint brownish tinge, cells *C* and *Sc*, stigma and the prearcular field darker yellowish brown; vein *Cu* and adjoining part of cell *M* not or scarcely darker. In *flavocauda*, the stigma is darker and there is a darkened seam in cell *M* adjoining vein *Cu*.

Male hypopygium with the outer tergal lobes obliquely truncated, the outer apical angle obtusely rounded, the sclerotized margin microscopically roughened, the inner angle not or scarcely produced into a spine. Outer basal lobe of the inner dististyle produced into two powerful spines from a common base, the spines slightly unequal, the outermost a little longer and slightly less acute at apex. Gonapophysis virtually as in *flavocauda*. Eighth sternite with the outer lateral blade elongate, obtuse at apex.

Habitat.—TEXAS. *Holotype*: ♂, Brewster County, June 1926 (O. C. Poling); University of Michigan.

The fly is named for the well-known collector of insects, the late Mr. O. C. Poling. The typical form of *flavocauda* Doane is found in southern Arizona and adjacent areas, in the vicinity of Tucson being the commonest representative of the genus during the spring months. In New Mexico, an evidently allied species, *Tipula* (*Lunatipula*) *stalagmites* Alexander, is found. The fly described herewith is the most easterly member of the group. It is possible that all three flies may be considered as subspecies in a relatively restricted chorocline, with *flavocauda* being the typical form and oldest name.

***Limonia* (*Dicranomyia*) *immanis* n. sp.**

Allied to *crauptoniana*, differing especially in the structure of the male hypopygium; ninth tergite large, the posterior border shallowly emarginate, lateral lobes conspicuous, with long yellow setae; basistyle and ventral dististyle very complicated by outgrowths; gonapophyses not setuliferous; aedeagus without spines.

♂. Length about 7.5–8 mm.; wing 7–8 mm.

♀. Length about 8 mm.; wing 8 mm.

Described from the type specimen that is mounted on a microscope slide. Rostrum and palpi brown. Antennae brown, the scape darker; flagellar segments oval, the terminal one pointed, more than one-half longer than the penultimate. Head dark brown; anterior vertex relatively broad, exceeding three times the diameter of the scape.

Thorax almost uniformly dark brown, variegated with paler on the dorsopleural and meral regions. Halteres with stem pale, knob weakly darkened. Legs with the coxae brownish yellow; trochanters yellow; remainder of legs brown, the femoral bases more brightened. Wings whitish subhyaline; stigma oval, brown, relatively conspicuous; veins brown. Venation: Sc_1 ending opposite origin of Rs , Sc_2 some distance from its tip, Sc_1 nearly three-fourths as long as Rs ; inner end of cell R_3 lying basad of that of cell $1st\ M_2$; m relatively short, less than $r-m$; $m-cu$ a short distance before the fork of M .

Abdomen more or less bicolored; tergites brown, sternites brownish yellow, their bases more infuscated; outer segments, including the hypopygium, more uniformly darkened. Male hypopygium with the tergite large, transversely rectangular, the posterior border with a broad and shallow emargination; lateral lobes conspicuous, tipped with long yellow setae; median tergal area slightly produced into an oval knob provided with about 15-16 long setae. Proctiger apparently divided into two roughly oval plates or blades, the apex more produced, microscopically spiculate, the roughenings continuing around the margin but more reduced. Basistyle with the ventromesal lobe very complex, comprised chiefly of a large flattened blade that is generally oval or triangular in outline, with ridges or crests, the surface with abundant setae; near base of blade with a cylindrical darkened lobe that bears a group of strong setae at apex. Dorsal dististyle a sinuous slender rod, the apex an acute spine. Ventral dististyle in total area subequal to the basistyle and its lobe, very complex in structure; on face of style near base with an oval tubercle and a much longer stout lobe, its tip obtuse; on lower margin of style, just cephalad of the rostral prolongation, with a flattened lobe that is fringed with long yellow setae; rostral prolongation with two straight black spines, arising close together at the narrowed part of a triangularly dilated outer rostral portion; just basad of the spines with a long slender tail-like lobe, both ends of which are hairy, the lower end and nearest the spines obtuse, with a conspicuous brush of setae; outer portion of this lobe narrowed to the subacute tip, the outer third

with abundant long erect pale setae. Aedeagus relatively slender, the outer third with erect short setae, the dorsal surface with two ridges that bear conspicuous spinous points for most of the length of the organ. Gonapophysis with the mesal-apical lobe stout, the surface with abundant microscopic setulae.

Habitat.—MICHIGAN. *Holotype*: ♂, mounted on microscope slide, Lake County, October 7, 1947 (J. Speed Rogers); Rogers Number 3583.

In addition to the holotype, the University of Michigan Collection includes the following specimens, which may be considered as being homotypical or paratypical: 2 ♂♂, 2 ♀♀, with the type and bearing the same field number; 2 ♂♂, on slides, Schoolcraft County, September 22, 1940; 2 ♂♂, 6 ♀♀, Iosco County, October 18 and 19, 1947, Nos. 18, 19 and 22; 3 ♂♂, 2 ♀♀, Ontario, York County, October 8, 1940, No. 8 (all J. Speed Rogers).

The most similar described species is *Limonia (Dicranomyia) cramptoniana* (Alexander), which has all details of the male hypopygium quite distinct, particularly the tergite, lobes of the ventral dististyle, gonapophysis and aedeagus. The male hypopygium of *cramptoniana* has been figured by the writer (Alexander, *Diptera of Connecticut*, fig. 35, B, 1942).

***Limonia (Dicranomyia) michigana* n. sp.**

Allied to *magnicauda broweriana*, differing especially in the structure of the male hypopygium; ninth tergite large, the caudal margin very slightly emarginate; ventromesal lobe of the basistyle unusually large and complex; ventral dististyle of about the same size as the basistyle, unusually complicated by outgrowths, particularly the rostral prolongation.

♂. Length about 8–10 mm.; wing 7–8.5 mm.

♀. Length about 9–10 mm.; wing 7.5–8.5 mm.

Described from the type specimens, mounted on a microscope slide.

Rostrum, palpi and antennae dark brown; flagellar segments oval; terminal segment about one-third longer than the penultimate. Head dark brown.

Thorax almost uniformly dark brown (on slide). Halteres pale, knob weakly more darkened. Legs with coxae and trochanters pale; remainder of legs dark brown, the femoral bases more brightened; claws (male) unusually simple, with one distinct but small basal tooth and an even less evident more basal spur. Wings subhyaline; stigma oval, pale brown, very poorly indicated; veins brown. Venation: Sc short, Sc_1 ending opposite to some distance before the origin of R_s , in extreme cases the distance between the two veins approximately one-fourth the length of R_s ; Sc_1 alone from one-third to one-fourth R_s ; $m-cu$ at or close to fork of M .

Abdomen dark brown, the incisures narrowly pale; hypopygium chiefly darkened, the ventral dististyle paler. Male hypopygium unusually large and complicated in structure. Ninth tergite large, only slightly transverse, the caudal margin very shallowly emarginate; lateral lobes low, with unusually long and abundant setae, at the summit of the lobe forming a loose brush; median region of tergite with a central furrow, near the posterior end of which is a small oval pocket bearing about six long setae. Proctiger large and well-developed, the lateral borders blackened and sclerotized, the apex paling into thin membrane. Basistyle of moderate size, the ventromesal lobe unusually large and complex, including a major blackened clavate structure, the margin of which is weakly notched and bearing a strong outer point, basad of which are a double series of spines, the outer ones directed slightly distad, the more basal series with the comb of teeth directed more cephalad; near base of lobe with a further stout clavate structure that bears numerous long setae. Dorsal dististyle a slender and relatively weak rod, nearly straight, narrowed to an acute point. Ventral dististyle about equal in size and complexity to the basistyle, on outer margin near base produced into a long sinuous rod that gradually widens to the subtruncate hairy tip; on inner face of style and possibly to be construed as being an apical lobe of the basistyle is a smaller lobe that is more expanded outwardly so as to appear more or less palmate, the margin with numerous strong spinous setae. Rostral prolongation unusually complex, comprised of two main branches, the more basal one more or less split

or divided at apex into two arms, one nearly glabrous, the other bearing several setae and bristles at apex; upper branch of the prolongation with the usual two spines placed at and before mid-length, beyond the outer spine very gradually narrowed to the subobtuse tip; spines oblique in position, directed outwardly, subequal in size; at base of prolongation on the disk of the style with a conical darkened lobe that bears several very long setae. Gonapophysis with the mesal-apical lobe slender, relatively small and weak, the tip curved, the margin irregularly crenulate. Aedeagus slender, straight, the tip weakly bilobed.

Habitat.—MICHIGAN. *Holotype*: ♂, mounted on microscope slide, Livingston County, Edwin S. George Reserve, November 1, 1948. (J. Speed Rogers). *Paratopotype*: ♂, mounted on slide with the type.

In addition to the types above mentioned, the University of Michigan Collection includes the following specimens, which may be considered as being homotypical or paratypical: More than 60 ♂♂, 40 ♀♀, from the type locality, between June 18 and November 1, especially on the latter date but with records for July, August and October. Further material from Livingston, Washtenaw, and Iosco Counties, the last taken October 18 from a low wet grassy alder thicket. This is *Limonia* (*Dicranomyia*) species 37-A as recorded by Rogers in his fine report on the crane-flies of the George Reserve (Univ. Michigan, Mus. of Zoology, Misc. Publ. 53: 1-128, 8 pls., map, 1942; reference on page 85); here the species is recorded as being apparently very local but numerous in two areas of wet grass-sedge-fern and shrub-sedge marsh in the big swamp of the George Reserve.

The fly is closest to *Limonia* (*Dicranomyia*) *magnicauda broweriana* Alexander, differing conspicuously in the structure of the male hypopygium. I wish to express my great indebtedness to Professor Rogers for the privilege of describing the present species and many others that he has collected in the past.

***Atarba* (*Atarba*) *bellamyi* n. sp.**

Thorax almost uniformly brownish yellow, unpatterned, the pleura very vaguely more pruinose; antennae with the flagellar segments bicolored, chiefly black, the proximal fourth or less

of the segments yellow, the amount of pale color decreasing on the outer segments; abdomen obscure yellow, weakly to scarcely darkened before the hypopygium; male hypopygium with the outer dististyle on margin with only three major spines, the apical point long and slender; aedeagus unusually small and slender.

♂. Length about 4.5–5 mm.; wing 4.8–5.5 mm.; antenna about 2.5–4 mm.

Rostrum chestnut brown; palpi black. Antennae (male) unusually variable in length, as shown by the measurements; scape and pedicel yellow, flagellar segments bicolored, chiefly black, with the proximal fourth or less yellow, the amount of this latter color decreasing in amount on the outer segments, the outermost being uniformly blackened; flagellar segments long-cylindrical; verticils unilaterally distributed, much longer than the erect pale shorter setae. Head brownish yellow.

Thorax almost uniformly brownish yellow, unpatterned, the pleura very vaguely more pruinose. Halteres with stem pale, knob infuscated. Legs with the coxae and trochanters yellow; femora yellow, the extreme tips blackened; tibiae and tarsi yellow, the outer segments of the latter brownish black; tibial spurs small pale. Wings with the ground brownish yellow, the prearcular and costal fields clearer yellow; veins brownish yellow. Venation: Sc_1 ending opposite or just beyond the origin of R_s , this vein about as long as R_s or the basal section of R_5 ; anterior branch of R_s gently sinuous; cell R_4 about two and one-half times as wide at margin as cell R_2 ; $m-cu$ about one-third to one-half its length beyond the fork of M .

Abdomen obscure yellow, weakly to scarcely darkened before the reddish yellow hypopygium. Male hypopygium with the appendage of the ninth sternite very short and broad, the outer apical angles extended laterad into acute spines. Outer dististyle on outer margin with only three major spines, the outermost largest, placed at near three-fifths the length of the style; the other spines are widely separated, with a few accessory microscopic denticles; apical point long and slender, with a further spine on lower margin just back of the apex. Gonapophysis pale, without spinous points. Aedeagus unusually small and slender.

Habitat.—FLORIDA, GEORGIA. *Holotype*: ♂, Welaka, Putnam County, Florida, on U. S. Fisheries Tract, at light-trap No. 3, July 1–2, 1946 (R. E. Bellamy); Collector's No. 1525; returned to Bellamy. *Paratopotypes*: 3 ♂♂, with the type; 1 ♂, July 26, 1946; Bellamy No. 1605. *Paratype*: ♂, Neel Gap, Union County, Georgia, July 5, 1947 (P. W. Fattig).

I am most pleased to name this very distinct fly for the collector, Dr. R. Edward Bellamy, who has done important work on the crane-flies of Florida. The species is entirely distinct from the only other eastern species, the genotype *Atarba* (*Atarba*) *picticornis* Osten Sacken, and also from the species in Cuba and the southwestern states. The most evident distinctions are found in the coloration of the antennae and abdomen, and in the structure of the male hypopygium, particularly the outer dististyle and aedeagus. The occurrence of the species in the mountains of northern Georgia was quite unexpected and indicates a much wider range for the fly than is known at this date.

Erioptera (Mesocyphona) femora-atra n. sp.

Allied to *caloptera*; size relatively small (wing, female, under 4 mm.); mesonotal praescutum buffy, with two broad black longitudinal stripes; femora black, the bases and a narrow ring at near three-fifths the length yellow, remainder of legs yellow; wings brown, spotted and dotted with white, the dark color much exceeding the pale in extent.

♂. Length about 3.4–3.5 mm.; wing 3.6–3.7 mm.

Rostrum and palpi black. Antennae with scape and pedicel black, more or less variegated with paler; basal segments of flagellum pale yellow, the outer ones passing into brown. Head buffy, the center of vertex dark brown.

Pronotum brownish black medially, the scutal lobes pale. Mesonotal praescutum buffy with two broad black intermediate stripes that are much broader than the median interspace, the latter slightly wider behind; lateral praescutal borders narrowly dark brown, crossing the suture behind onto the scutal lobes; intermediate praescutal stripes continued caudad, including the mesal portions of the scutal lobes; scutellum buffy;

postnotum darkened. Pleura dark brown, with a broad longitudinal silvery stripe. Halteres with stem whitened, knob dark brown. Legs with the coxae and trochanters obscure yellow; femora brownish black to black, with a narrow yellow ring at near three-fifths the length, the bases restrictedly obscure yellow; remainder of legs light yellow. Wings with the ground color brown, more saturated along the costal border, variegated by numerous white spots and dots, including a series of about seven along the anterior border, the second not reaching costa; fourth pale area continued across wing as a narrow, only slightly broken band that extends to vein *Cu*; all longitudinal veins behind and excepting R_5 with a white marginal spot; remaining cells of wings with scattered white spots; in brief, the pattern is dark with a much more restricted pale pattern; veins pale brown, pale in the white areas. Venation: Cell M_2 open by the atrophy of the basal section of M_3 .

Abdomen chiefly dark brown.

Habitat.—GEORGIA. *Holotype*: ♀, Valdosta, Lowndes County, May 28, 1946 (P. W. Fattig). *Paratopotypes*: 2 ♀♀.

Although the present fly is generally similar to *Erioptera* (*Mesocyphona*) *caloptera* Say, it seems certainly to be distinct in the pattern of the legs and wings, as described. All three type specimens are virtually identical in the points indicated.

Notes on Some Aquatic Insects of the Brandywine Creek Drainage, Chester County, Pennsylvania

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During 1948 a biological survey of the Conestoga Basin, Lancaster County, Pennsylvania, was carried on by the Academy of Natural Sciences of Philadelphia for the Sanitary Water Board of the Commonwealth of Pennsylvania. At this time a limited number of similar collections was made in the Brandywine Creek Drainage. As a result of the interest shown in stream pollution in the state, particularly in the Brandywine Drainage, it has